



Australian Bureau of Statistics

1297.0 - Australian Standard Research Classification (ASRC), 1993

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The Australian Standard Research Classification (ASRC) is the collective name given to a set of three related classifications designed for use in the measurement and analysis of research and experimental development (R&D) undertaken in Australia.

This 1993 edition of the ASRC has been prepared by the Australian Bureau of Statistics (ABS) in co-operation with the following organisations:

Australian Science and Technology Council
Australian Vice-Chancellors' Committee
Commonwealth Scientific and Industrial Research Organisation
Department of Employment, Education and Training
Department of the Environment, Sport and Territories
Department of Health
Department of Industry, Technology and Regional Development
Department of Primary Industries and Energy
The National Health and Medical Research Council

The contributions made by these organisations are gratefully acknowledged.

The 1998 edition of the ASRC is now also available on this website.

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INTRODUCTION

Purpose of the ASRC

1. The Australian Standard Research Classification (ASRC) is the collective name given to a set of three related classifications developed for use in the measurement and analysis of research and experimental development (R&D) undertaken in Australia, both in the public and private sectors. It aims to facilitate the comparison of R&D data between sectors of the Australian economy (e.g. general government, private non-profit organisations, business enterprises and educational institutions).

2. In developing these classifications it is intended to ensure that R&D statistics are made useful to governments, educational institutions, international organisations, scientific, professional or business organisations, business enterprises, community groups and private individuals.

3. In order to support international comparisons, it is considered important for the classifications to relate to those used in other countries, particularly those whose stage of social and economic development is similar to that of Australia. Therefore, the definition, scope and classification of R&D activities contained in this publication have been largely devised in accordance with the Organisation for Economic Co-operation and Development (OECD) Proposed Standard Practice for Surveys of Research and Experimental Development, "FRASCATI MANUAL", Fifth Revision 1992.

4. Interim versions of the classifications contained in the ASRC have been used for the compilation of R&D statistics up to and including 1990-91. Details have been released in the following ABS publications: **Research and Experimental Development, Business Enterprises** (8104.0); **Research and Experimental Development, General Government and Private Non-Profit Organisations** (8109.0); **Research and Experimental Development, Higher Education Organisations** (8111.0); and **Research and Experimental Development, All Sector Summary** (8112.0).

5. The classifications in this publication are extensions and refinements of those earlier versions. The development of these current versions has been undertaken by the ABS in co-operation with major user and research organisations. This consultative process has sought to ensure that the ASRC is widely accepted and used within Australia as an Australian Standard, not only in the compilation of R&D statistics but also in the study of Australian research generally.

Classifications included in the Publication

6. There are three classifications in the ASRC, namely, **Type of Activity Classification, Field of Research Classification and Socio-economic Objective Classification**. These are used in official statistics to analyse the nature of R&D undertaken in Australia. The classifications are used in conjunction with industrial and institutional sector classifications to produce a set of official statistics which support a variety of user interests.

Type of Activity Classification (TOA)

7. This classification allows R&D activity to be categorised according to the type of research effort, namely, **pure basic research, strategic basic research, applied research and experimental development**.

8. Definitions and guidelines for classifying R&D by TOA are covered in Chapter 2.

Field of Research Classification (FOR)

9. This classification allows R&D activity to be categorised according to the field of research undertaken. In this respect, it is the nature of the R&D which is being examined. The classification is based primarily on recognised academic disciplines and evolving areas of study.

10. Explanatory notes, definitions and guidelines for classifying R&D data by field of research and the full classification are covered in Chapter 3.

Socio-economic Objective Classification (SEO)

11. This classification allows R&D to be categorised according to the purpose of the R&D as perceived by the data provider (researcher). It consists of discrete economic, social, technological or scientific domains for identifying the principal purpose of the R&D. The attributes applied to the design of the SEO Classification comprise a combination of processes, products, health, education and other social and environmental aspects of particular interest.

12. Explanatory notes, definitions and guidelines for classifying R&D by socio-economic objective and the full classification are covered in Chapter 4.

Advantages of the ASRC

13. The ASRC provides a three way matrix of classification. Each R&D activity can be classified by **Type of Activity**, **Field of Research** and **Socio-economic Objective**.

14. The ASRC provides a considerable degree of flexibility in meeting the needs of a wide variety of users. The hierarchical structure of both the FOR and SEO Classifications enables them to be applied to particular purposes at various levels, including the aggregation of data at the division, subdivision or group levels.

15. If the requirement is for general policy purposes, then a variety of approaches are available. For example, by using data compiled according to both the FOR and SEO Classifications, it is possible to identify how much R&D expenditure in any particular field of research has been devoted to a particular socio-economic objective. The ASRC helps classify multi-disciplinary work, where several disparate areas of the FOR are usually brought together to address one area, or closely related areas of the SEO.

16. The complexity of issues addressed by R&D is such that questions of public policy often arise in a manner which cannot be readily seen in advance. The detail available in both the FOR and SEO Classifications would be sufficient to facilitate the provision of statistics which can be used in a variety of contexts. For example, areas of key technological significance could generally be assessed using an aggregate of appropriate FOR groups or classes. It is possible therefore that the use of the ASRC for ABS R&D surveys may obviate or minimise the need for separate one-off R&D surveys aimed at narrow areas.

17. A particular strength of the ASRC is that it preserves comparability with much previous data in the ABS R&D series, while possessing a framework which enables comparisons with other classifications used nationally and internationally.

18. In the case of the FOR Classification, a concordance is available between the FOR and other comparable classification schemes used internationally. (See para. 16 on page 12.)

19. In the case of the SEO Classification, comparison is possible with Frascati Manual categories. (See page 61.) In addition, there is a strong alignment between the SEO and the **Australian and New Zealand Standard Industrial Classification** (ANZSIC). This is most applicable within the manufacturing subdivision of the SEO. Thus it is possible to correlate trends in industry with levels of R&D directed towards particular industries, by using both SEO and ANZSIC data.

Definition of Research and Experimental Development

20. R&D is defined according to the OECD standard as comprising **creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.**

21. An R&D activity is characterised by originality. It has investigation as a primary objective, the outcome of which is new knowledge, with or without a specific practical application, or new or improved materials, products, devices, processes or services. R&D ends when work is no longer primarily investigative.

Scope of Research and Experimental Development

22. As indicated in the FRASCATI Manual and as experience has shown, there are

difficulties in delineating the point which clearly separates the culmination of R&D investigative work and the beginning of the implementation phase of the innovations or recommendations resulting from R&D. Errors at this point are particularly significant because, although R&D programmes require vast outlays of resources, the costs of implementing innovations or recommendations resulting from R&D are also often as high or higher.

23. There are also a wide range of scientific and related activities which are not R&D, but which are closely linked with R&D in terms of organisation, resource allocation, institutional affiliation and the use or flow of information. However, activities conducted solely or primarily for the purposes of R&D support are included in R&D.

24. The activities which have obscure boundaries with R&D are listed below.

(a) Education and training of personnel and students

Post graduate research including supervision of the research is considered to be R&D. The development of new teaching methods is also regarded as R&D. However, teaching and training students, using established methods and subject knowledge, is excluded.

(b) Specialised scientific and technical information services

Specialised scientific and technical information services which are undertaken solely in support of R&D are regarded as R&D. Examples of these are scientific data collection, coding, recording, classification, dissemination, translation, analysis and bibliographic services.

These specialised services are excluded if they are undertaken independently and not solely in support of R&D.

(c) General purpose or routine data collection

Collecting data in support of R&D work is included in R&D.

However, data collection of a general nature is excluded. This is normally carried out by government agencies to record natural, biological, economic or social phenomena of general public or government interest. Examples are national population censuses, surveys of unemployment, topographical mapping and routine geographical surveys.

(d) Maintenance of national standards

Routine testing and analysis of materials, components, products, processes, soils, atmospheres, etc. for standard compliance is excluded from R&D.

(e) Feasibility studies

Feasibility studies undertaken in support of R&D are included.

However, a feasibility study which involves gathering information about existing conditions, for use in deciding whether or not to implement a project, is excluded, e.g. a study to determine the viability of a petrochemical complex in a particular location.

(f) Specialised medical care

R&D includes the development of new treatments and procedures, including such

developments in conjunction with advanced medical care and examinations usually carried out by university hospitals.

However, routine investigations or normal application of specialised medical knowledge are excluded from R&D. Examples of these are pathology, forensic and post mortem procedures.

(g) Patent and licence work

Patent work connected directly with R&D projects is included in R&D. However, commercial, administrative and legal work associated with patenting, copywriting and licensing, are excluded.

(h) Policy related studies

The boundary between certain policy related studies as described in the Frascati Manual and R&D is complex. In the Frascati Manual, policy related studies cover activities such as the 'analysis and assessment of existing programmes, continued analysis and monitoring of external phenomena (e.g. defence and security analysis), legislative inquiry concerned with general government departmental policy or operations'. Rigour is required to separate policy related studies which are not R&D from bona fide R&D policy work.

Studies to determine the effects of a specific national policy to a particular economic or social condition or social group have elements of R&D. Routine management studies or efficiency studies are excluded.

(i) Marketing and market studies

Market research and opinion polls are excluded from R&D.

(j) Mineral exploration

The development of new or vastly improved methods of data acquisition, processing and interpretation of data is included as R&D. Surveying undertaken as an integral part of an R&D project to observe geological phenomena is also regarded as R&D. However, the search for minerals using existing methods is excluded from R&D.

(k) Prototypes and pilot plants

The design, construction and testing of prototypes generally falls within the scope of R&D. However, trial production and copying of prototypes are excluded from R&D.

The construction and operation of pilot plants is part of R&D provided that these are used to obtain experience or new data for evaluating hypotheses.

Pilot plants are excluded as soon as the experimental phase is over or as soon as they are used as normal commercial production units even if they continue to be described as 'pilot plants'.

If a pilot plant is used for combined operations, the component used for R&D is to be estimated.

(l) Other activities

All other activities which are ancillary or consequential to R&D are excluded. Examples of these are interpretative commentary using existing data, forecasting, operations research

as a contribution to decision making and the use of standard techniques in applied psychology to classify or diagnose human characteristics.

R&D Unit to be Classified

25. There are some inherent difficulties in formulating a definition of what it is that constitutes a unit of R&D. Because there is a lack of uniformity in organisational structures and considerable variance in the way organisations allocate resources to R&D activities, any **standard** definition of a unit of R&D seems certain to be somewhat theoretic. From a statistical viewpoint it is desirable that R&D expenditure be reported in the smallest cluster which can be classified to a single field of research and a single socio-economic objective. The extent to which it is not practicable to provide this detail will reduce the validity and usefulness of R&D statistics.

26. The most common real world references to an R&D unit whose activities are to be classified are **Research Program** and **Research Project**. However, these focal units would seldom approximate the idealised unit of R&D as outlined above. They may or may not correspond to actual organisational structures. In its most simple form, a Research Project may consist of a part of the time and energy of an unfunded or own account single entity (such as a PhD student).

27. There are Research Projects, especially in the social sciences, which require a multi-disciplinary approach in order to achieve a purpose. There are also Research Projects which consist of sub-projects. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has cited a Research Project as often consisting of a set of sub-projects (staff) with a common purpose and one person designated as the project leader.

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ABOUT THIS RELEASE

This is a compendium of three classifications developed specifically for the compilation of standardised research and development statistics. It comprises classifications for type of activity, field of research and socio-economic objective.

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